

WHAT IS CLAIMED IS:

1. A liquid crystal display apparatus comprising:
a lower substrate including a first transparent substrate;
5 an upper substrate facing the first transparent substrate, the upper substrate
including a second transparent substrate;
a liquid crystal layer interposed between the lower substrate and the upper
substrate; and
a retardation layer interposed between the first and second transparent
10 substrates, the retardation layer compensating phase difference of light that passes
through the liquid crystal layer.

2. The liquid crystal display apparatus of claim 1, wherein the
retardation layer comprises a liquid crystal polymer.

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3. The liquid crystal display apparatus of claim 2, wherein the liquid
crystal polymer corresponds to cholesteric liquid crystal.

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4. The liquid crystal display apparatus of claim 1, wherein the
retardation layer includes reactive mesogen mixture (RMM), polyvinylalcohol (PVA),
polycarbonate (PC), or cycloolefin polymer (COP).

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5. The liquid crystal display apparatus of claim 1, wherein the upper
substrate further comprises a color filter layer, and the retardation layer is disposed
on the color filter layer to protect the color filter layer.

6. The liquid crystal display apparatus of claim 1, wherein the upper substrate further comprises a color filter layer and a protection layer disposed on the color filter layer, the protection layer protecting the color filter layer, and the 5 retardation layer is disposed on the protection layer.

7. The liquid crystal display apparatus of claim 1, wherein the upper substrate further comprises a color filter layer, a protection layer disposed on the color filter layer, a common electrode layer disposed on the protection layer, and the 10 retardation layer is disposed on the common electrode layer.

8. The liquid crystal display apparatus of claim 1, wherein the lower substrate further comprises a pixel electrode and an alignment film, wherein the retardation layer being interposed between the pixel electrode and the alignment film.

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9. A method of manufacturing a color filter substrate, comprising:
forming a color filter layer on a transparent substrate;
coating a liquid crystal material on the color filter layer;
irradiating an ultraviolet light onto the liquid crystal material to form a
20 retardation layer with a fixed alignment of liquid crystal molecules of the liquid crystal material, the retardation layer;
forming a common electrode layer on the retardation layer; and
forming an alignment film on the common electrode layer.

25 10. The method of claim 9, wherein the liquid crystal material is coated

via a micro gravure coating method or a capillary coating method.

11. The method of claim 9, wherein the retardation layer comprises reactive mesogen mixture (RMM), polyvinylalcohol (PVA), polycarbonate (PC) or
5 cycloolefin polymer (COP).

12. The method of claim 9, wherein the liquid crystal material corresponds to a cholesteric liquid crystal.

10 13. The method of claim 9, wherein a polarized ultraviolet light is irradiated to form the retardation layer having a function of a biaxial film.

14. The method of claim 9, wherein a non-polarized ultraviolet light is irradiated onto the retardation layer to form the retardation layer having a function of
15 a C-plate film.

15. A method of manufacturing a color filter substrate, comprising:
forming a color filter layer on a transparent substrate;
forming a protection layer on the color filter layer;
coating a liquid crystal material on the protection layer;
irradiating an ultraviolet light onto the liquid crystal material to form a retardation layer with a fixed alignment of liquid crystal molecules of the liquid crystal material, the retardation layer;
forming a common electrode layer on the retardation layer; and
25 forming an alignment film on the common electrode layer.

16. The method of claim 15, wherein the liquid crystal material is coated via a micro gravure coating method or a capillary coating method.

5 17. The method of claim 15, wherein the retardation layer comprises reactive mesogen mixture (RMM), polyvinylalcohol (PVA), polycarbonate (PC) or cycloolefin polymer (COP).

10 18. The method of claim 15, wherein the liquid crystal material corresponds to a cholesteric liquid crystal.

19. The method of claim 15, wherein the ultraviolet light is polarized to form the retardation layer having a function of a biaxial film.

15 20. The method of claim 15, wherein the ultraviolet light corresponds to a non-polarized ultraviolet light to form the retardation layer having a function of a C-plate film.

20 21. A method of manufacturing a color filter substrate, comprising:
forming a color filter layer on a transparent substrate;
forming a protection layer on the color filter layer;
forming a common electrode layer on the protection layer;
coating a liquid crystal material on the common electrode layer;
irradiating an ultraviolet light onto the liquid crystal material to form a
25 retardation layer with a fixed alignment of liquid crystal molecules of the liquid crystal

material, the retardation layer; and
forming an alignment film on the retardation layer.

22. The method of claim 21, wherein the liquid crystal material is coated
5 via a micro gravure coating method or a capillary coating method.

23. The method of claim 21, wherein the retardation layer comprises
reactive mesogen mixture (RMM), polyvinylalcohol (PVA), polycarbonate (PC) or
cycloolefin polymer (COP).

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24. The method of claim 21, wherein the liquid crystal material
corresponds to a cholesteric liquid crystal.

25. The method of claim 21, wherein the ultraviolet light is polarized to
15 form the retardation layer having a function of a biaxial film.

26. The method of claim 21, wherein the ultraviolet light corresponds to
a non-polarized ultraviolet light to form the retardation layer having a function of a C-
plate film.

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27. A method of manufacturing an array substrate, comprising:
forming a pixel electrode on a region of a substrate, such that the pixel
electrode is electrically connected to a switching device, the region being defined by
a gate line and a data line;
25 coating a liquid crystal material on the pixel electrode layer;

irradiating an ultraviolet light onto the liquid crystal material to form a retardation layer with a fixed alignment of liquid crystal molecules of the liquid crystal material, the retardation layer; and

forming an alignment film on the retardation layer.

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28. The method of claim 27, wherein the liquid crystal material is coated via a micro gravure coating method or a capillary coating method.

29. The method of claim 27, wherein the retardation layer comprises
10 reactive mesogen mixture (RMM), polyvinylalcohol (PVA), polycarbonate (PC) or cycloolefin polymer (COP).

30. The method of claim 27, wherein the liquid crystal material
15 corresponds to a cholesteric liquid crystal.

31. The method of claim 27, wherein the ultraviolet light is polarized to form the retardation layer having a function of a biaxial film.

20 32. The method of claim 27, wherein the ultraviolet light corresponds to a non-polarized ultraviolet light to form the retardation layer having a function of a C-plate film.